

The present invention as recited in new Claims 29-38 is directed to a remote control access system controlled by a radio frequency transmitter and employing access codes or signature control words which are conveniently reprogrammable by action of the system user. The system programming is accomplished via the same radio frequency signal transmission link used during the normal system operation to arm or disarm the system. This permits the receiver or control unit to be placed in a hidden location, enhancing security. The user need not know the location of the receiver or any of the codes, which simplifies the programming operation. All the user need do to program a new code is to switch the system into the program mode, and to actuate the transmitter to transmit its encoded signal. The system automatically stores the code in memory, for use in subsequent comparisons against the received signals during the normal operating-receiving mode.

Claims 39-43 define the system as including first and second transmitters which respectively transmit a first N-bit code word and a second M-bit code word, and the control unit may be electronically programmed during a program mode to accept either code as a valid code word.

Claims 44-50 are directed to a remote control access system responsive only to the receipt of two successive valid codes over a radio frequency signal transmission link in order to recognize the received code as valid.

Claims 51 and 52 are directed to a remote control access system wherein two different radio frequency transmitters are employed, one transmitting a first digital code word, the other transmitting a second digital code word. The control unit is responsive to receipt of the first digital word to enable access to a first predetermined area, and is responsive to receipt of the second

digital code word to enable access to a second predetermined area. Claim 34 is directed to a similar feature.

Claim 53 is directed to a method of operating a user-programmable remote control access system, wherein a radio frequency transmitter and receiver are employed to program a signature control word only by transmitting an encoded radio-frequency signal when the system is in the program mode.

Claims 54-61 are directed to a specific automotive vehicle security system for a vehicle. The system includes a portable hand-held transmitter, and an access control unit located in the vehicle and operable in a program mode and an operating receiving mode. The control unit may be programmed with a new code received during the program mode from the transmitter over the same radio frequency signal transmission link used during the system operating-receiving mode..

Twardowski is directed to a transmitter and receiver for controlling remote elements. The transmitter comprises an RF transmitter for transmitting a serial code to the remotely located receiver, a conventional manner of operation for garage door openers and some vehicle security systems. While the disclosed system includes a way of changing the security code, the manner of achieving this function is quite different from applicant's system. The Twardowski system employs a separate optical (infrared) data transmission link between the receiver and transmitter to change the security code. This separate data is said to be mandated by FCC rules and regulations pertaining to garage door openers (column 3, lines 20-34). Thus, the receiver 30 is also provided with optical transmission elements including light emitting diode 36, and the transmitter 11 is also provided with optical data receiving elements including photo-transistor 21. Adding such additional transmitter and receiver elements to the

respective system receiver and transmitter devices tends to increase their cost and complexity, as well as their size. Transmitter size is an important criterion for vehicle security system applications, where it is desired to employ very small transmitters which can be fitted on a user's key chain.

Another drawback to the system disclosed in Twardowski is that, by virtue of the optical programming link, the transmitter 11 and the receiver 30 must be placed in close proximity for programming operations (column 4, lines 37-39), and indeed, within a line of sight of each other, i.e., with no intervening barriers. In a security system application, mounting the receiver in an exposed location is undesirable, since accessibility for programming also provides accessibility for tampering.

Pinnow is directed to an apparatus and method for a universal locking system. A signal-transmitting unit is mounted on a wristwatch, by which a light signal (in the infrared range) is transmitted to a light signal receiving unit for controlling the latching and unlatching of a lock mechanism. The signal receiving unit can store a large number of codes so that a single lock can be opened by a multiplicity of different codes. In order to program a new system code, the user first manually enters the new code into the memory of the signal transmitting memory, then actuates control key 56 and the signal transmitting unit to program the new code into the memory of the signal receiving unit (column 8, line 19-50; column 10, lines 49-55).

With the Pinnow system, the user must himself program the signal transmitting unit with the new code, and thereafter place the signal transmitting unit in close proximity to the signal receiving unit. Thus, programming a new code requires substantial involvement by the user, who must select and manually enter the new code

into the memory of the signal-transmitting unit. And the Pinnow system, utilizing an optical infrared link, suffers the same drawback as discussed above for the Twardowski system, i.e., during programming, the signal receiving and signal transmitting units must be in close proximity to one another and in a line of sight with each other. In fact, the Pinnow system requires such close proximity not only for programming operations, but also for normal operation to open the lock.

From the above discussion, it is apparent that there are significant distinctions between applicant's claimed invention and the Twardowski and Pinnow system, including the following:

1. Both Twardowski and Pinnow utilize optical programming links, requiring the transmitter and receiver be in close proximity during programming, and preferably within a line of sight of each other. Pinnow also uses the optical link during the normal operating mode. In contrast, applicant's invention employs a radio frequency link for both the programming and normal operating mode. This simplifies the apparatus and reduces the cost, particularly over the dual-link Twardowski link.

2. Applicant's radio frequency link has a substantially greater range than the optical or infrared links employed by Twardowski and Pinnow. A typical range for a small radio frequency transmitter is 60 to 100 feet, whereas the optical link range is probably only a few feet.

3. Use of a radio frequency link for programming and normal system operation as in applicant's invention for a vehicle security system allows the receiver/control unit to be hidden in the vehicle where it is not readily accessible to anyone, and where even the user need not know its location, yet

it can be programmed by the driver/user regardless of its location. It is impractical in such an application to require that the receiver be within a line of sight of the transmitter, as apparently required by Twardowski and Pinnow, since this would leave the control unit accessible to tampering, or require a secure enclosure area which may be opened by the user, an additional expense.

4. Neither Twardowski nor Pinnow teach a remote control access system wherein two successive valid codes must be received in order for the system to recognize that a valid code has been received, such as is recited in Claims 44-50. The Examiner contends that such a feature is obvious from these references and the general knowledge of code access systems. Applicant respectfully requests that the Examiner specify the basis of such general knowledge if the rejection is maintained regarding these new claims.

5. Twardowski teaches a system wherein the new code is generated by his receiver unit and then transmitted to the transmitter over the optical programming link. In contrast, applicant's system relies only on the transmitter to send the code to be recorded during the programming mode, over the radio frequency link as described above. This distinction results in the advantages noted above in paragraphs 1-3. The Examiner remarks that the claimed order of having a receiver control unit programmed via a transmitter-encoder unit is obvious to one of ordinary skill in the art. Yet applicant's system is distinguished not only in the order of programming but in the manner in which the programming is carried out. Further, the use of different transmission links for programming and

operating modes requires the receiver also include a transmitter, and the transmitter also include a receiver, as well as memory programming circuitry. These additional elements increase the complexity and cost of the system.

6. The user need not know the code in applicant's system. Claims 37, 43 and 56 are directed to a system wherein the transmitters are encoded by the manufacturer so that the system user is not required to encode the transmitter. The Examiner states that the systems of Twardowski and Pinnow could be restricted to fixed code programming which does not require a user to know or choose or input a selected code for programming. Pinnow is apparently not subject to such modification, since the user must first manually enter a new code into the signal-transmitting unit. Moreover, that a system could be so modified does not render the invention obvious unless the modification is taught or suggested by the prior art. There is no such teaching apparent in either reference.

7. The Examiner states that the claimed different types of transmitters and receivers do not patentably distinguish over Pinnow. Pinnow makes no suggestion in the abstract that his system be used for vehicles. In any event, Pinnow does not suggest that infrared transmitter could be an R.F. transmitter, since infrared systems have been used for vehicle applications.

8. The system of Claims 32, 49 and 57 includes a feature of automatically terminating the program mode after a pre-established time delay from receipt of a transmitted encoded signal during the program mode. The Examiner suggests that this is obvious in view of Pinnow, and any operation including time to

access could routinely be programmed by the system Pinnow. To the extent this rejection is maintained for these claims, applicant notes that there must be some teaching or suggestion in the art to so program Pinnow for this to be obvious. Pinnow teaches against such modification, requiring instead that the program switch be activated to exit the program mode.

9. Claims 34 and 51-52 are directed to a remote control access system wherein one transmitter enables access to a first area (or certain areas) while a second transmitter enables access to a second area (or other areas). Pinnow does not teach or suggest such a feature.

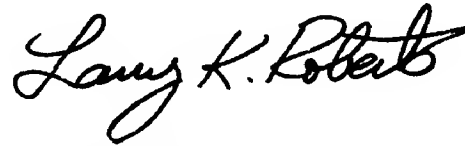
10. Claim 36 depends from Claim 29 and is directed to a remote control access system wherein the transmitter is capable of generating a plurality of different encoded signals, and the system can be armed or disarmed only by receipt of each of the plurality of encoded signals. This increases the level of security provided by the system. None of the art of record teaches such a feature.

11. Neither Pinnow nor Twardowski teach a security system responsive to both an N-bit transmitter code and an M-bit transmitter code, where N need not equal M. Claims 38-44 are directed to such a system.

Applicant appreciates the citation of the additional references Chlers and Weishaupt, but considers the pending claims patentable over these references as well.

In view of the foregoing discussion and amendments, Claims 29-61 are considered allowable. Such favorable reconsideration of the outstanding rejections is solicited.

Respectfully submitted,

A handwritten signature in cursive script, reading "Larry K. Roberts".

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